a detecting device which detects at least one mark pattern provided on the beam

attenuating filter in order to obtain at least one of position information and rotation

information of the beam attenuating filter.

REMARKS

Claims 1-27 are pending. By this Preliminary Amendment, the specification and

claims 1-27 are amended. Prompt and favorable consideration on the merits is respectfully

requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37

C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

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Attached: APPENDIX
Date: September 26, 2001

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APPENDIX

Changes to Specification:

Page 1, between lines 2 and 3, a new paragraph is added.

Page 5, lines 1-18:

The present invention provides a first exposure method which stitches and exposes a plurality of patterns on a substrate, thereby exposing a larger pattern than each of the patterns on the substrate, wherein a plurality of patterns (30A to 30D) are stitched and exposed such that partial regions of the patterns are superposed on each other in a first direction (X direction) and a second direction (Y direction) which intersect with each other, and, in a region (31) where four patterns are adjacent to each other, the four patterns are exposed such that corner portions of the four patterns are superposed on each other, with exposure amounts of the corner portions of the four patterns being respectively set based on a characteristic obtained by multiplying a first characteristic which gradually decreases outward along the first direction by a second characteristic which gradually decreases outward along the second direction when respectively exposing the four patterns.

Page 6, line 20 to page 7, line 13:

The present invention provides a second exposure method which stitches and exposes a plurality of patterns on a substrate, thereby exposing a larger pattern than each of the patterns on the substrate, wherein a plurality of patterns (32A to 32D) are stitched and exposed such that partial regions of the patterns are superposed on each other in a first direction (X direction) and a second direction (Y direction) which intersect with each other, and, in a region (33, 34) in which four patterns are adjacent to each other, of a first pair of the patterns and a second pair of the patterns which are obliquely opposed to each other, the first pair of patterns (32A, 32D) are exposed with respective rectangular corner

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portions of the first pair of the patterns being superposed on each other and the second

pair of patterns (32B, 32C) are exposed with corner portions (33, 34) of respective

triangles of the second pair of patterns being provided adjacently to each other in the

rectangular corner portions.

Page 7, lines 14-24:

According to the above-mentioned present invention, the corner portions of the

three adjacent patterns (32A, 32B, 32D) are superposed and exposed in one of the

triangular regions (33) in a region where the four patterns are provided adjacently to each

other, and the corner portions of the three adjacent patterns (32A, 32C, 32D) are

superposed and exposed in the other triangular region (34). In the corner portions, the

amounts of exposure are decreased outward with predetermined characteristics,

respectively. Therefore, the amount of integral exposure is almost equal to the amounts

of integral exposure in other portions.

Page 8, lines 1-23:

Next, the present invention provides a first exposure apparatus which transfers a

pattern of a mask (R) onto a substrate (W), comprising an illumination optical system (1

to 3, 6 to 8) which illuminates the mask, a field stop (4) which is disposed at a

substantially conjugate position with respect to a pattern plane of the mask in the

illuminating optical system and which serves to set an illuminating region on the mask, a

substrate stage (25) which positions the substrate, and a beam attenuating filter (55)

which is provided on a plane in proximity to the pattern plane of the mask a conjugate

plane with respect to the pattern plane or a plane in proximity to the conjugate plane, and

which serves to set a transmittance for illumination light for exposing a region

corresponding to at least one corner portion of a pattern region having an external shape

substantially parallel with a first direction and a second direction, which intersect each

other, of the pattern plane based on a characteristic obtained by multiplying a first

characteristic which gradually decreases outward along the first direction by a second

characteristic which gradually decreases outward along the second direction. By the

exposure apparatus, the first exposure method according to the present invention can be

used.

Page 8, line 24 to page 9 line 23:

Moreover, the present invention provides a second exposure apparatus comprises a

beam attenuating filter (56) having the following characteristic in place of the beam

attenuating filter of the first exposure apparatus. More specifically, the beam attenuating

filter serves to set, of first and second pairs of corner portions, which are opposed

obliquely to each other, of a pattern region having an eternal shape substantially parallel

with a first direction and a second direction, which intersect each other, of the pattern

plane, a transmittance for illumination light for exposure in a region corresponding to the

first pair of corner portions based on a first characteristic which gradually decreases

outward along the first direction or a second characteristic which gradually decreases

outward along the second direction, and to set a transmittance for illumination light for

exposure in a region corresponding to a second pair of corner portions, in a triangular

region expanded outward along an opposed direction of the pair of corner portions, based

on a characteristic obtained by adding the first characteristic which gradually decreases

outward along the first direction and the second characteristic which gradually decreases

outward along the second direction. By the second exposure apparatus, the above-

mentioned second exposure method can be used.

Page 16, line 5 to page 17, line 2:

Fig.1 is a view showing a schematic structure of a projection exposing apparatus

to be used in an example of an embodiment of the present invention. Fig.2 is an enlarged

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view showing an example of the structure of a reticle blind 4 in Fig.1. Fig.3 is an

enlarged perspective view showing the structure of a movable stage of a positioning

device 5 in Fig.1. ~~Fig.4 is a~~ Figs.4A to 4C are diagrams showing transmittance

distribution of a density filter 55 in Fig.1. Fig.5 is a diagram showing a projected image

obtained by carrying out a transfer while performing a screen stitch by using the density

filter 55 in Fig.4A. Fig.6 is a diagram illustrating a method of removing an incomplete

portion through the reticle blind. ~~Fig.7 is a~~ Figs.7A to 7D are diagrams showing the

transmittance distribution of a density filter 56 according to another example of the

embodiment of the present invention. Fig.8 is a diagram showing a projected image

obtained by carrying out a transfer while performing a screen stitch by using the density

filter 56 in Fig.7A. Fig.9 is a view showing a main part of the embodiment in which a

thin film for dustproof is provided in the density filter 55, a part of which is taken away.

Page 29, lines 2-22:

Fig.4~~(a)~~ 4A is a diagram showing the transmittance distribution of the filter portion of

the density filter 55. In Fig.4~~(a)~~ 4A, directions corresponding to the X and Y directions in

Fig.1 are set to be x and y directions, respectively. Moreover, a grating pattern formed in the

filter portion of the density filter 55 is virtually drawn to indicate coordinates. Actually, a

transmittance in the filter portion is substantially changed continuously between 1 (100%)

and 0 (0%). More specifically, a large number of very fine dot patterns are formed in the

filter portion to obtain a desirable transmittance distribution by changing the size and density

of each dot pattern depending on positions. A transmission substrate itself for the density

filter 55 has a transmittance of 1. Moreover, it is desirable that the size and density of the dot

pattern should be regulated to set a transmittance distribution thereof to obtain a desired

distribution of the amount of illuminating light on the reticle or the wafer in consideration of

diffracted light generated from the dot pattern and the optical characteristics (distortion and the like) of the illuminating optical system.

Page 30, line 14 to page 31, line 1:

In the rectangular filter portion of the density filter 55 in Fig.4(a) 4A, the widths of stitch portions (superposed portions) 55a and 55b of both ends in the x direction which are superposed and exposed when carrying out stitch exposure are represented by a, the widths of stitch portions (superposed portions) 55c and 55d of both ends in the y direction are represented by b, and the widths in the x and y directions of an internal region surrounded by the stitch portions 55a to 55d are represented by a_0 and b_0, respectively. Moreover, the range in the x and y directions of the filter portion is as follows when the lower left apex of the rectangular filter portion is set to be an origin in the positions x and y.

Page 32, line 9 to page 33, line 5:

In this case, a transmittance TA_1 in a region (A1) to be a rectangular corner portion in the lower left part of the filter region has a distribution obtained by multiplying a distribution (x/a) for a one-dimensional outward reduction in the x direction by a distribution (y/a) for one-dimensional outward reduction in the y direction. Moreover, transmittances TA_3, TA_7 and TA_9 in the areas of lower right, upper left and upper right rectangular corner portions in the filter region have the distribution obtained by multiplying the distribution for a one-dimensional outward reduction in the x direction by the distribution for one-dimensional outward reduction in the y direction, respectively. Furthermore, the transmittance T in a region provided along a BB line in Fig.4(a) 4A is linearly changed from 0 to 1 (100%) with respect to a position x corresponding to a variation in the position x from 0 to a as shown in Fig.4(b) 4B. Similarly, the transmittance T in a region provided along a CC line in Fig.4(a) 4A is linearly changed from 0 to 1 (100%) with respect to a position y corresponding to a variation in the position y from 0 to b as shown in Fig.4(c) 4C.

Page 33, lines 6-24:

In the present example, the pattern of the reticle R in Fig.1 is illuminated through the density filter 55 having the transmittance distribution of Fig.4~~(a)~~ 4A and the reduced image of the pattern is exposed to a part in one shot region on the wafer W. Then, the reticle on the reticle stage 21 is sequentially exchanged with another reticle and the wafer W is stepped by a predetermined amount through the wafer stage 25. Thereafter, the pattern of the reticle thus exchanged is illuminated through the density filter 55 and the reduced image of the pattern is exposed to another portion in the shot region on the wafer W so that regions (which are also referred to as "stitch portions") corresponding to the stitch portions 55a to 55d in Fig.4~~(a)~~ 4A in the adjacent reduced images are superposed and exposed. Thus, the reduced images of the patterns of the reticles in the shot region on the wafer W are transferred while carrying out a screen stitch in the X and Y directions. The amount of integral exposure which is almost uniform is given over the whole shot region by using the density filter 55.

Page 34, lines 1-23:

Fig.5 shows a large projected image exposed to one shot region on the wafer W in Fig.1 by the exposure carrying out the screen stitch in the present example. In Fig.5, rectangular projected images 30A, 30B, 30C and 30D constituted by the reduced images of the patterns of different reticles are exposed with stitch portions 30AB and 30CD in a boundary portion in the X direction and stitch portions 30AC and 30BD in a boundary portion in the Y direction superposed double, respectively. In a rectangular stitch portion 31 in which four projected images 30A to 30D are provided adjacently to each other, furthermore, the rectangular corner portions of the four projected images 30A to 30D are superposed fourfold and exposed. In this case, if the rotation error of the density filter 55 in Fig.4~~(a)~~ 4A and the reticle on the reticle stage 21 in Fig.1 is not completely eliminated by the positioning device 5, it is preferable that the reticle stage 21 should be rotated to set off the

rotation error and the coordinate system of the wafer stage 25 should be corrected by the

rotation error, and the wafer W should be stepped obliquely based on the corrected coordinate

system. Consequently, the error (dose error) of the amount of exposure in the stitch portion

can be reduced.

Page 35, lines 5-18:

Description will be given to the fact that the amount of integral exposure in the stitch

portions 30AB, 30BD, 30CD, 30AC and 31 is 100%. For simplicity of the description, a

projecting magnification from the density filter 55 in Fig.4(a) 4A to the wafer W in Fig.5 is

set to 1, and the widths of the stitch portions 30AB and 30CD in the X direction are

represented by a and the widths of the stitch portions 30BD and 30AC in the Y direction are

represented by b. Moreover, if a point P3 in Fig.5 is taken as an origin of coordinates (X, Y)

and the coordinates of a point P with the point P3 to be the origin are (X, Y), coordinates (X_A,

Y_A), (X_B, Y_B), (X_C, Y_C) and (X_D, Y_D) are as follows when the lower left portions of the

projected images 30A, 30B, 30C and 30D are set to be origins.

Page 38, line 17 to page 39, line 2:

By equations (15) to (19), it is apparent that the amount of integral exposure of 100%

can be obtained uniformly in the whole regions after the stitch exposure including the   ·

rectangular stitch portion 31 in which the four projected images 30A to 30D are adjacent to

each other by using the density filter 55 in Fig.4(a) 4A. Subsequently, a circuit pattern

having a uniform line width is formed in each shot region on the wafer W through the steps

of development, etching, resist separation and the like. By repeating the step of forming a

circuit pattern, a semiconductor device having a large area and high function can be mass

produced.

Page 43, line 18 to page 44, line11:

Next, another example of the preferred embodiment of the present invention will be described with reference to Figs.7A to 7D and 8. Also in the present example, the projected images of a plurality of reticle patterns are exposed onto a wafer while carrying out a screen stitch by using a projection exposing apparatus having basically the same structure as that of the projection exposing apparatus shown in Fig.1. The present example is different in that the density filter 56 in Fig.7(a) 7A is used in place of the density filter 55 in Fig.1 (Fig.4(a) 4A). In addition, the structures according to the above-mentioned embodiments including variants and the like can be applied. In Figs.7 and 8, portions corresponding to those of Figs.4 and 5 have the same reference numerals respectively, and description will be given to the distribution of the transmittance of the density filter 56 and the distribution of the amount of exposure which is obtained by carrying out the exposure while performing a screen stitch.

Page 44, lines 12-23:

Fig.7(a) 7A shows the filter portion of the density filter 56 in the present example. In Fig.7(a) 7A, the widths of stitch portions 56a and 56b of both ends in the x direction which are superposed and exposed when carrying out stitch exposure are represented by a, the widths of stitch portions 56c and 56d of both ends in the y direction are represented by b, and the widths in the x and y directions of an internal region surrounded by the stitch portions 56a to 56d are represented by a_0 and b_0, respectively. Moreover, the range in the x and y directions of the filter portion is as follows when the lower left apex of the rectangular filter portion is set to be an origin in the positions x and y.

Page 46, lines 7-18:

In this case, a transmittance TB_1 in a region (B1) to be the corner portion of a triangle in the lower left part of the filter region is set based on a value obtained by adding a distribution (x/a) for a one-dimensional outward reduction in the x direction and a distribution (y/a) for a one-dimensional outward reduction in the y direction. As shown in

Fig.7(d) 7D, a transmittance T along a line DD in the region (B1) is linearly decreased

outward along a position y' in an oblique direction. A transmittance TB11 in a region (B11)

of the corner portion of a triangle in the upper right part of the filter region is also set

symmetrically with the transmittance TB_1.

Page 46, line 19 to page 47, line 11:

Moreover, the rectangular corner portion in the lower right part of the filter region is

divided into adjacent triangular regions (B3) and (B4), and corresponding transmittances TB_3

and TB_4 have a distribution for a one-dimensional outward reduction in the y direction and a

distribution for a one-dimensional outward reduction in the x direction, respectively.

Similarly, the rectangular corner portion in the upper left part of the filter region is also

divided into adjacent triangular regions (B8) and (B9), and corresponding transmittances TB_8

and TB_9 are set to be symmetrical with the transmittances TB_4 and TB_3. Moreover, the

transmittance T in a region provided along a BB line in Fig.7(a) 7A is linearly changed from

0 to 1 (100%) with respect to a position x as shown in Fig.7(b) 7B and the transmittance T in

a region provided along a CC line in Fig.7(a) 7A is linearly changed from 0 to 1 (100%) with

respect to a position y as shown in Fig.7(c) 7C.

Page 47, lines 12-17:

Also in the present example, the reticle on the reticle stage 21 in Fig.1 is illuminated

through the density filter 56 having the transmittance distribution of Fig.7(a) 7A and the

reduced image of the pattern of the reticle is exposed to a shot region on the wafer W while

carrying out a screen stitch.

Changes to Claims:

The following are marked-up versions of the amended claims:

1.   (Amended) An exposure method which stitches and exposes a plurality of patterns on a substrate, thereby exposing a larger pattern than each of the patterns on the substrate, ~~characterized by~~ comprising:

stitching and exposing a plurality of patterns such that partial regions of the patterns are superposed on each other in a first direction and a second direction which intersect with each other, and

exposing, in a region where four patterns are adjacent to each other, the four patterns such that corner portions of the four patterns are superposed on each other with exposure amounts of the corner portions of the four patterns being respectively set based on a characteristic obtained by multiplying a first characteristic which gradually decreases outward along the first direction by a second characteristic which gradually decreases outward along the second direction when respectively exposing the four patterns.

2.   (Amended) An exposure method as recited in claim 1, ~~characterized in that~~ wherein

when the corner portion of one of the four adjacent patterns is exposed,

an exposure amount at the corner portion is set to have a value proportional to $(x/a) \cdot (y/b)$,

wherein widths in the first and second directions of the corner portion are respectively represented by "a" and "b" and coordinates increasing inward in the corner portion along the first and second directions are respectively represented by "x" and "y" with an apex of the corner portion being set to be a point of origin.

3.   (Amended) An exposure method which stitches and exposes a plurality of patterns on a substrate, thereby exposing a larger pattern than each of the patterns on the substrate, ~~characterized by~~ comprising:

stitching and exposing a plurality of patterns such that partial regions of the patterns are superposed on each other in a first direction and a second direction which intersect with each other, and

exposing, in a region in which four patterns are adjacent to each other, of a first pair of the patterns and a second pair of the patterns which are obliquely opposed to each other, the first pair of patterns with respective rectangular corner portions of the first pair of the patterns being superposed on each other and the second pair of patterns with corner portions of respective triangles of the second pair of patterns being provided adjacently to each other in the rectangular corner portions.

4.   (Amended) An exposure method as recited in claim 3, ~~characterized in that~~ wherein

when respectively exposing the second pair of patterns, exposure amounts of the corner portions of the triangles of the patterns are set based on a characteristic obtained by adding a first characteristic which gradually decreases outward along the first direction and a second characteristic which gradually decreases outward along the second direction, and

when respectively exposing the first pair of patterns, exposure amounts of the corner portions of the patterns are set based on a characteristic which gradually decreases outward one-dimensionally.

5.   (Amended) An exposure apparatus which transfers a pattern of a mask onto a substrate, ~~characterized by~~ comprising:

an illumination optical system which illuminates the mask;

a field stop which is disposed at a substantially conjugate position with respect to a pattern plane of the mask in the illuminating optical system and which serves to set an illuminating region on the mask;

a substrate stage which positions the substrate; and

a beam attenuating filter which is provided on a plane in proximity to the pattern plane of the mask, a conjugate plane with respect to the pattern plane, or a plane in proximity to the conjugate plane and which serves to set a transmittance for illumination light for exposing a region corresponding to at least one corner portion of a pattern region having an external shape substantially parallel with a first direction and a second direction, which intersect each other, of the pattern plane based on a characteristic obtained by multiplying a first characteristic which gradually decreases outward along the first direction by a second characteristic which gradually decreases outward along the second direction.

6.   (Amended) An exposure apparatus which transfers a pattern of a mask onto a substrate, ~~characterized by~~ comprising:

an illumination optical system which illuminates the mask;

a field stop which is disposed at a substantially conjugate position with respect to a pattern plane of the mask in the illuminating optical system and which serves to set an illuminating region on the mask;

a substrate stage which positions the substrate; and

a beam attenuating filter which is provided on a plane in proximity to the pattern plane of the mask, a conjugate plane with respect to the pattern plane, or a plane in proximity to the conjugate plane, wherein

the beam attenuating filter serves to set, of first and second pairs of corner portions, which are opposed obliquely to each other, of a pattern region having an eternal shape substantially parallel with a first direction and a second direction, which intersect each other, of the pattern plane, a transmittance for illumination light for exposure in a region corresponding to the first pair of corner portions based on a first characteristic

which gradually decreases outward along the first direction or a second characteristic which gradually decreases outward along the second direction, and to set a transmittance for illumination light for exposure in a region corresponding to a second pair of corner portions, in a triangular region expanded outward along on opposed direction of the pair of corner portions, based on a characteristic obtained by adding the first characteristic which gradually decreases outward along the first direction and the second characteristic which gradually decreases outward along the second direction.

7.   (Amended) An exposure apparatus as recited in claim 5 ~~or 6, characterized by~~ further comprising:

a positioning member which positions the beam attenuating filter in a plane perpendicular to an optical axis of illuminating light for exposure, and

a dustproof film disposed in a position set apart from a filter surface of the beam attenuating filter by a predetermined interval.

8.   (Amended) An exposure apparatus as recited in claim 7, ~~characterized in that~~ wherein

the beam attenuating filter is disposed close to the field stop in the illuminating optical system such that the dustproof film is set between the beam attenuating filter and the field stop.

9.   (Amended) An exposure apparatus as recited in claim 8, ~~characterized in that~~ wherein

the beam attenuating filter is disposed apart from a conjugate plane with respect to the pattern plane of the mask by a predetermined distance in the illuminating optical system.

10.   (Amended) An exposure apparatus as recited in claim 5 ~~or 6, characterized by~~ further comprising:

a mark detecting system which detects a mark on the mask and a mark on the

beam attenuating filter, and

a driving mechanism which moves the beam attenuating filter based on a result of

detection obtained by the mark detecting system.

11.   (Amended) An exposure apparatus as recited in claim 10, ~~characterized in~~

~~that~~ wherein

the driving mechanism moves the beam attenuating filter in a plane perpendicular

to an optical axis of the illuminating optical system.

12.   (Amended) An exposure apparatus as recited in claim 10 ~~or 11~~,

~~characterized in that~~ wherein

the beam attenuating filter is disposed apart from the conjugate plane with

respect to the pattern plane of the mask by a predetermined distance in the illuminating

optical system.

13.   (Amended) An exposure apparatus as recited in claim 12, ~~characterized in~~

~~that~~ wherein

the driving mechanism can move the beam attenuating filter along an optical axis

of the illuminating optical system in order to regulate the positional relationship with the

conjugate plane and can be inclined with respect to a plane perpendicular to the optical

axis.

14.   (Amended) An exposure method which respectively transfers a pattern onto

at least two regions having peripheral portions partially superposed on each other on a

substrate, ~~characterized in that~~ comprising:

in order to obtain at least one of position information and rotation information of

a beam attenuating filter which gradually decreases, in a portion in which the at least two

regions are superposed on each other, light amount on the substrate of illumination light

illuminated on the pattern, <u>detecting</u> at least one mark pattern provided on the beam

attenuating filter ~~is detected~~.

15.   (Amended) An exposure method as recited in claim 14, ~~characterized in that~~
<u>wherein</u>

the relative relationship between the mask on which the pattern is formed and the

beam attenuating filter is regulated based on the information obtained.

16.   (Amended) An exposure method as recited in claim 14, ~~characterized in that~~
<u>wherein</u>

at least one of position and inclination of the beam attenuating filter with respect

to an optical axis in an optical system in which the beam attenuating filter is disposed is

regulated based on the information obtained.

17.   (Amended) An exposure apparatus which respectively transfers a pattern

onto at least two regions having peripheral portions partially superposed on each other on

a substrate, ~~characterized by~~ comprising:

a beam attenuating filter which gradually decreases light amount on the substrate

of illumination light illuminated on the pattern in a portion in which the at least two

regions are superposed on each other, and

a detecting device which detects at least one mark pattern provided on the beam

attenuating filter in order to obtain at least one of position information and rotation

information of the beam attenuating filter.

18.   (Amended) An exposure apparatus as recited in claim 17, ~~characterized by~~

further comprising:

an actuator which drives the beam attenuating filter in order to regulate at least

one of position and rotation of the beam attenuating filter.

19. (Amended) An exposure apparatus as recited in claim 17, ~~characterized in that~~ wherein

the detecting device detects at least one of relative position information and relative rotation information between the beam attenuating filter and a mask on which the pattern is formed.

20. (Amended) An exposure apparatus as recited in claim 17, ~~characterized in that~~ wherein

the beam attenuating filter is disposed to be shifted from a pattern plane of a mask on which the pattern is formed or a conjugate plane thereof.

21. (Amended) A mask, ~~characterized in that~~ wherein

a device pattern is formed by screen-stitching of a plurality of mask patterns by the exposure apparatus as recited in ~~any one of~~ claims 5 ~~to 13 and 17 to 20~~.

22. (Amended) A method of manufacturing a device, ~~characterized by~~ comprising ~~a step of~~ transferring a device pattern onto a photosensitive substrate by using the exposing method as recited in ~~any one of~~ claims 1 ~~to 4 and 14 to 16~~.

23. (Amended) A method of manufacturing a device, ~~characterized by~~ comprising ~~a step of~~ transferring a device pattern onto a photosensitive substrate by using the exposing method as recited in ~~any one of~~ claims 5 ~~to 13 and 17 to 20~~.

24. (Amended) A method of manufacturing a mask using the exposing method as recited in ~~any one of~~ claims 1 ~~to 4 and 14 to 16~~, ~~characterized by~~ comprising ~~a step of~~ transferring a plurality of mask patterns onto a mask substrate while carrying out a screen-stitching by using the exposing method.

25. (Amended) A method of manufacturing an exposure apparatus which transfers a mask pattern onto a substrate, ~~characterized in that~~ comprising assembling, with a predetermined positional relationship,

an illumination optical system which illuminates the mask,

a field stop which is disposed at a substantially conjugate position with respect to a pattern plane of the mask in the illuminating optical system and serves to set an illuminating region on the mask,

a substrate stage which positions the substrate, and

a beam attenuating filter disposed on a plane in proximity to the pattern plane of the mask, a conjugate plane with respect to the pattern plane or a plane in proximity to the conjugate plane, and serves to set a transmittance for illumination light for exposing a region corresponding to at least one corner portion of a pattern region having an external shape substantially parallel with a first direction and a second direction, which intersect each other, of the pattern plane based on a characteristic obtained by multiplying a first characteristic which gradually decreases outward along the first direction by a second characteristic which gradually decreases outward along the second direction~.

are assembled with a predetermined positional relationship.

26.   (Amended) A method of manufacturing an exposure apparatus which transfers a mask pattern onto a substrate, characterized in that comprising assembling, with a predetermined positional relationship,

an illumination optical system which illuminates the mask,

a field stop which is disposed at a substantially conjugate position with respect to a pattern plane of the mask in the illuminating optical system and serves to set an illuminating region on the mask,

a substrate stage which positions the substrate, and

a beam attenuating filter disposed on a plane in proximity to the pattern plane of the mask, a conjugate plane with respect to the pattern plane or a plane in proximity to the conjugate plane, and serves to set, of first and second pairs of corner portions, which are

opposed obliquely to each other, of a pattern region having an external shape substantially

parallel with a first direction and a second direction, which intersect each other, of the

pattern plane, a transmittance for illumination light for exposure in a region

corresponding to the first pair of corner portions based on a first characteristic which

gradually decreases outward along the first direction or a second characteristic which

gradually decreases outward along the second direction, and to set a transmittance for

illumination light for exposure in a region corresponding to a second pair of corner

portions, in a triangular region expanded outward along an opposite direction of the pair

of corner portions, based on a characteristic obtained by adding the first characteristic

which gradually decreases outward along the first direction and the second characteristic

which gradually decreases outward along the second direction,.

~~are assembled with a predetermined positional relationship.~~

27.   (Amended) A method of manufacturing an exposure apparatus which

respectively transfers a pattern onto at least two regions having peripheral portions

partially superposed on each other on a substrate, ~~characterized in that~~ comprising

assembling, with a predetermined positional relationship,

a beam attenuating filter which gradually decreases, in a portion in which the at

least two regions are superposed on each other, light amount on the substrate of

illumination light illuminated on the pattern, and

a detecting device which detects at least one mark pattern provided on the beam

attenuating filter in order to obtain at least one of position information and rotation

information of the beam attenuating filter,.

~~are assembled with a predetermined positional relationship.~~